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BC8

APPLICATION NO.	FILING DA[illegible]	FIRST NAMED INVENTOR		ATTORNEY DOCKET NO.
09/038,562	03/11/98	CHAO	H	63345

WM31/0712

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EXAMINER	
JOHNSON, T	
ART UNIT	**PAPER NUMBER**
2623	16

DATE MAILED: 07/12/01

Please find below and/or attached an Office communication concerning this application or proceeding.

Commissioner of Patents and Trademarks

O-90C (Rev. 2/95)
U.S. GPO: 2000-473-000/44602

1- File Copy

Office Action Summary	Application No. 09/038,562	Applicant(s) Chao et al.
	Examiner T. Johnson	Group Art Unit 2623

—The MAILING DATE of this communication appears on the cover sheet beneath the correspondence address—

Period for Response

A SHORTENED STATUTORY PERIOD FOR RESPONSE IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a response be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for response specified above is less than thirty (30) days, a response within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for response is specified above, such period shall, by default, expire SIX (6) MONTHS from the mailing date of this communication .
- Failure to respond within the set or extended period for response will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).

Status

☒ Responsive to communication(s) filed on 10/3/00.

☒ This action is **FINAL.**

☐ Since this application is in condition for allowance except for formal matters, **prosecution as to the merits is closed** in accordance with the practice under *Ex parte Quayle,* 1935 C.D. 1 1; 453 O.G. 213.

Disposition of Claims

☒ Claim(s) ~~16-21~~ 1-32 ~~is~~/are pending in the application.

Of the above claim(s) 1-15 & 22-32 ~~is~~/are withdrawn from consideration.

☐ Claim(s) ______ is/are allowed.

☒ Claim(s) 16-21 ~~is~~/are rejected.

☐ Claim(s) ______ is/are objected to.

☐ Claim(s) ______ are subject to restriction or election requirement.

Application Papers

☐ See the attached Notice of Draftsperson's Patent Drawing Review, PTO-948.

☐ The proposed drawing correction, filed on ______ is ☐ approved ☐ disapproved.

☐ The drawing(s) filed on ______ is/are objected to by the Examiner.

☐ The specification is objected to by the Examiner.

☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. § 119 (a)-(d)

☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 11 9(a)-(d).

☐ All ☐ Some* ☐ None of the CERTIFIED copies of the priority documents have been

☐ received.

☐ received in Application No. (Series Code/Serial Number) ______.

☐ received in this national stage application from the International Bureau (PCT Rule 1 7.2(a)).

*Certified copies not received: ______.

Attachment(s)

☒ Information Disclosure Statement(s), PTO-1449, Paper No(s). 13

☐ Notice of References Cited, PTO-892

☐ Notice of Draftsperson's Patent Drawing Review, PTO-948

☐ Interview Summary, PTO-413

☐ Notice of Informal Patent Application, PTO-152

☐ Other ______

Office Action Summary

Part III Detailed Action

Disclosure of Information

1. The Applicant is respectfully requested to provide the Patent Office with reference number 5 on page 35 of Calderbank et al., “Wavelet Transforms that Map Integers to Integers”. This reference is used in the rejection of the instant claims herein below. The document should be obtainable, since two of the inventors are common to the instant case. For the Applicant's convenience, the reference, as it is listed in Calderbank et al., is repeated verbatim as follows:

“[5] H. Chao and P. Fisher. An approach of fast integer reversible wavelet transform for image compression. Preprint.” This date of this document should precede August 1996, since it is cited in Calderbank et al. dated August 1996.

Disclosure

2. The objection to the specification regarding the browser-executable code on page 45, lines 12-15, and page B-11, lines 15-16, is maintained. The Applicant argues that the “code is not intended to be executable from the patent application”. However, regardless of the Applicant's intention, it will be executable. A copy of a memo dated March 20, 2000 follows for the Applicant's convenience:

DATE: March 20, 2000

TO: Patent Examining Group Directors

/signed/
FROM: Stephen G. Kunin
Deputy Assistant Commissioner
for Patent Policy and Projects

SUBJECT: Hyperlinks and other forms of browser-executable code in the text of patent applications.

This memo supersedes the February 1, 2000 memo.

It has been brought to my attention that applicants are embedding hyperlinks and other forms of browser-executable code into the text of their patent

applications. Examples of a hyperlink or a browser-executable code are a URL placed between these symbols "< >" and http:// followed by a URL address. When a patent application with embedded hyperlinks and/or other forms of browser-executable code issue as a patent and the patent document is placed on the PTO web page, when the patent document is retrieved and viewed via a web browser; the URL is interpreted as a valid HTML code and it becomes a live web link. When a user clicks on the link with a mouse, the user will be transferred to another web page identified by the URL, if it exists, which could be a commercial web site. PTO policy does not permit the PTO to link to any commercial sites since the PTO exercises no control over the organization, views or accuracy of the information contained on these outside sites.

Effective immediately, examiners must review patent applications to make certain that active hyperlinks and other forms of browser-executable code, especially commercial site URLs, are not included in a patent application. If applicant is attempting to incorporate by reference, in the patent application, information found on a web page identified by a URL in the form of a hyperlink and/or other forms of browser-executable code, examiners should object to the specification and indicate to applicants that the embedded hyperlinks and/or other forms of browser-executable code are impermissible and require deletion. The attempt to incorporate subject matter into the patent application by reference to a hyperlink and/or other forms of browser-executable code is considered to be an improper incorporation by reference. See MPEP 608.01(p), paragraph I regarding incorporation by reference. Where the hyperlinks and/or other forms of browser-executable codes are part of applicant's invention and are necessary to be included in the patent application in order to comply with the requirements of 35 U.S.C. 112, first paragraph, and applicant does not intend to have these hyperlinks be active links, examiners should not object to these hyperlinks. The Office will disable these hyperlinks when preparing the patent text to be loaded onto the PTO web database. Note that nucleotide and/or amino acid sequence data placed between the symbols "< >" are not considered to be hyperlinks and/or browser-executable code and therefore, should not be objected to as being an improper incorporation by reference (see 37 CFR 1.821 – 1.825). This notice also does not apply to electronic documents listed on forms PTO-892 and PTO-1449 where the electronic document is identified by reference to a URL.

MPEP § 608.01 and § 608.01(p) will be amended in the upcoming 7th edition, revision 1 to include the subject matter of this memo. It is also anticipated that 37 CFR 1.52 will be amended to prohibit the inclusion of active hyperlinks and/or other forms of browser-executable code in patent specifications.

Any questions concerning this notice should be directed to Magdalen Greenlief, Office of the Deputy Assistant Commissioner for Patent Policy and Projects at 305-8813.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

4. Claims 16-20 are rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Chui et al., 5,604,824, Calderbank et al., Wavelet Transforms That Map Integers to Integers, and Said et al., An image multiresolution representation for lossless and lossy compression.

For claim 16, image compression system comprising an image source providing an image, the image having pixels, each of the pixels having a finite number of bits is provided by all of the references, since the pixels would not otherwise exist. In any case, see at least block 12 in Fig. 1 and block 44 in Fig. 2, blocks 18 and 47 in Figs. 3a – 3c (a source of images for the wavelet transform), and at least c. 9, lines 25-65, and the paragraph bridging cols. 10-11 (bits per pixel), of at least Chui et al. Additionally, a source of images of a finite number of bits is also provided by Said et al. in at least the left side of Fig. 1 on page 1304, and bits are explicitly recited in at least the first two full paragraphs in section V on page 1308, as well as throughout their specification. Furthermore, Calderbank et al. also explicitly recite the conventionality of bits in processing on at least pages 25 and 30.

An image compression system comprising a compressor coupled to the image source, the compressor configured to generate a compressed image is provided by Chui et al. in Fig. 1, blocks 12 and 20, which compresses an "input document" using a wavelet transform; c. 15, lines 33-39 (an image compression system), and based on an integer wavelet transform is further provided by Chui et al. in the abstract, lines 6-10; c. 3, line 64 – c. 4, line 2; c. 4, lines 47-56; c. 23, lines 55-64; c. 25, line 66 – c. 26, line 3; c. 24, lines 49-52; c. 27, lines 44-54; 28, lines 49-58, c. 34, lines 36-47; c. 45, lines 4-15; Fig. 2, blocks 48a, 48b, and 48c; and Fig. 17, blocks 134a, 134b, and 134c. See also at least Fig. 1 of Said et al., which shows an image source and

subsequent wavelet transformation for compression. Furthermore, Calderbank et al. at least inherently take an image for some "source", such as to the wavelet transforms of at least Figs. 4-5, since otherwise they would transforming nothing.

Chui et al. does not explicitly provide for the well known lifting scheme to obtain integer wavelet transforms, but does provide for the claimed selecting from different integer wavelet transforms as shown in Fig. 2, blocks 48a, 48b, and 48c, from which, one of three wavelet transforms is selected, as noted in c. 15, lines 33-52. Calderbank et al. teaches that it is well known to use the lifting scheme for integer wavelet transforms starting on page 19, section 3. It would've been obvious to one having ordinary skill in the art at the time the invention was made to use a lifting scheme, as taught by Calderbank et al., with one of the transforms of Chui et al. in Fig. 2, blocks 48a, 48b, or 48c, since "Lifting is a flexible technique that has been used in several different settings, for an easy construction and implementation of "traditional" wavelets [32], and of "second generation" wavelets [33]", "lifting allows us to immediately find the inverse" even "though the transform now is non-linear", as "long as the transform is written using lifting, the inverse transform can be found immediately", and because "lifting allows us to obtain an integer transform using simply truncation and without losing invertibility" as taught by Calderbank et al. on page 20, lines 14-16, and page 21, line 1, line 8, and lines 15-16. Wherein wavelet coefficients of the integer wavelet transform have the same finite number of bits as the pixels of the image is at least suggested by Chui et al., from the input of the transform to the output of the transform, since the wavelet transform itself does not change the number of bits itself. In any case, for further evidence, Calderbank et al. also describe this conventionality on at least page 35. It would've been obvious to one having ordinary skill in the art at the time the invention was made to transform with the same number of bits as the pixels with the integer wavelet transform of Chui et al., since Calderbank et al. note that such a convention "is useful for certain implementations".

Chui et al. does not explicitly provide for the well correction method to obtain integer wavelet transforms, but does provide for the claimed selecting from different integer wavelet transforms as shown in Fig. 2, blocks 48a, 48b, and 48c, from which, one of three wavelet transforms is selected, as noted in c. 15, lines 33-52. Said et al. teach that it is well known to use

the correction method for integer wavelet transforms starting in the paragraph bridging pages 1303 – 1304 and primarily in section II on page 1304, where the S+P transform used by Said et al. is a correction method (that Said et al. provide for a "correction method" is further indicated by the Applicant's specification on page 38, lines 13-15). It would've been obvious to one having ordinary skill in the art at the time the invention was made to use a correction method, as taught by Said et al., with one of the transforms of Chui et al. in Fig. 2, blocks 48a, 48b, or 48c, since "the S+P transform yields more compression than single-resolution linear predictive coding methods of similar complexity, and can be calculated with a very small computational effort", because Said et al. "propose entropy-coding methods that exploit the multiresolution structure and that can efficiently compress the S+P transformed image for progressive-resolution transmission", because Said et al. "propose an embedded coding method, and show that its rate distortion function is comparable to those of the most efficient lossy compression methods" for "progressive-fidelity transmission", and that the "compression rates obtained with both types of progressive transmission are among the best in the literature", so that "with the proper image transformation, fast inspection schemes can be readily combined with lossless compression, resulting in a negligible penalty in both compression efficiency and coding complexity", as taught by Said in the paragraph bridging pages 1303-1304. Wherein wavelet coefficients of the integer wavelet transform have the same finite number of bits as the pixels of the image is at least suggested by Chui et al., from the input of the transform to the output of the transform, since the wavelet transform itself does not change the number of bits itself. In any case, for further evidence, Said et al. also provide for the conventionality of the claimed "same finite number of bits" in at least section II on page 1304 below equation 5. It would've been obvious to one having ordinary skill in the art at the time the invention was made to transform with the same number of bits as the pixels with the integer wavelet transform of Chui et al., since Said et al. note that "the S+P transform yields more compression than single-resolution linear predictive coding methods of similar complexity, and can be calculated with a very small computational effort", because Said et al. "propose entropy-coding methods that exploit the multiresolution structure and that can efficiently compress the S+P transformed image for progressive-resolution transmission",

because Said et al. "propose an embedded coding method, and show that its rate distortion function is comparable to those of the most efficient lossy compression methods" for "progressive-fidelity transmission", and that the "compression rates obtained with both types of progressive transmission are among the best in the literature", so that "with the proper image transformation, fast inspection schemes can be readily combined with lossless compression, resulting in a negligible penalty in both compression efficiency and coding complexity", as taught by Said in the paragraph bridging pages 1303-1304.

For claim 17, the image compression system of claim 16, wherein the compressor quantizes a wavelet transformed image to produce the compressed image is provided by Chui et al. in block 50 of Fig. 2 and c. 15, lines 53-59.

For claim 18, the image compression system of claim 16, wherein the compressor entropy encodes (e.g. Huffman or arithmetic) a quantized image to produce the compressed image is provided by Chui et al. in c. 15, line 66 – c. 16, line 1 with respect to Fig. 2, block 52, as implemented by apparatus block 64 in Fig. 4, which can be any one of several entropy coders as noted in c. 17, lines 51-65.

For claim 19, the image compression system of claim 16, wherein the compressor performs a color transformation to produce the compressed image is provided by Chui et al. in c. 9, lines 26-44, where the image is color transformed from any one of several different image formats into RGB. Additionally, a color transform can also be construed as the color transform reduction process of Chui et al. in c. 10, line 55 – c. 11, line 2, where a dithering process and mapping colors from a color histogram are certainly color transformations as well, and which transforms provide for further compression as noted in c. 15, lines 10-31.

For claim 20, see the rejection of at least claim 16. An image decompression system comprising a compressed image source providing a compressed image is provided by at least

Chui et al. in at least c. 37, lines 20-50. A decompressor coupled to the compressed image source, the decompressor configured to generate a decompressed image based on an integer inverse wavelet transform derived using a technique selected from one of more than one method is provided by Chui et al. where cited above for claim 16, and in c. 4, lines 47- 60; c. 27, lines 55-61; c. 36, lines 60-67; c. 37, line 49 – c. 39, line 22; c. 39, lines 8-22; c. 40, lines 10-12 and lines 48-31; c. 41, lines 41-51; c. 42, lines 27-28; c. 45, lines 4-15; Fig. 17, blocks 134a, 134b, and 134c. The particular technique is selected in at least c. 15, lines 39-52 and the paragraph bridging cols. 38-39, with respect to Fig. 2, blocks 48a, 48b, and 48c (compression), and Fig. 17, blocks 134a, 134b, and 134c (decompression). That the lifting scheme and a correction method are used in a decompression system are obvious for the same reasons noted above for claim 16, of which arguments apply here and are incorporated herein. As a further note on decompression, in the "correction method" provided by Said et al., they recite that the inverse transform, i.e. that which is necessary to obtain the image in the decompression process, is basically the reverse of the transformation in the left col. on page 1305, about the last 16 lines of section II including equation 9, much like the decompression process of Chui et al. "performing substantially the inverse operations of" the compression system, "and as such uses quite similar circuitry to accomplish the same" – last sentence in c. 36 of Chui et al. Similarly, Calderbank et al., who provide for the conventional and well known lifting scheme noted above, also provide for an inverse transform in accordance with the lifting scheme, which is basically the reverse of the forward transform, on page 20, last six lines, and the inverse transform is again recited on page 21, line 1, lines 8-14. Wherein wavelet coefficients of the integer wavelet transform have the same finite number of bits as the pixels of the image is at least implicitly provided by Chui et al., from the input of the transform to the output of the transform, since the wavelet transform itself does not change the number of bits itself. Calderbank et al. also describe this conventionality on at least page 35. Said et al. also provide for the conventionality of the claimed "same finite number of bits" in at least section II on page 1304 below equation 5. See also at least page 22, equation 3.8, of Calderbank et al. where the inverse wavelet transform is just the "reverse" of the forward wavelet transform, at least the abstract of Calderbank et al., where the compression is

lossless, so that the same bits per pixel will be at the input as at the output, and at least page 35. Similarly, the compression and decompression of Said et al. also has a lossless implementation, and thus also has the same bits per pixel at the input as at the output, which also has the same number of bits per wavelet coefficient in section II on page 1304. See also Chui et al. in at least the last full paragraph in c. 36.

5. Claims 21 is rejected under 35 U.S.C. 103(a) as being unpatentable over the combination of Chui et al., 5,604,824, Calderbank et al., Wavelet Transforms That Map Integers to Integers, and Said et al., An image multiresolution representation for lossless and lossy compression, as applied to claims 16-20 above, and further in view of Rich et al., 5,831,625.

For claim 21, see the rejection of at least claim 16, which also applies herein.

There is a very subtle difference between the claim and the reference of Chui et al., which is that the claim requires a computer-readable medium storing a computer program for directing a computer system to perform image compression, wherein the computer program implements steps for performing integer wavelet transformation of an input image having a finite number of bits per pixel, quantizing the wavelet transformed image, entropy coding the quantized image, and outputting a file that includes the entropy coded image, wherein wavelet coefficients of the wavelet transformed image have the same finite number of bits as the pixels of the input image, while Chui et al., Calderbank et al., and Said et al. provide for all of these acts by separate programs instead of a single program.

Chui et al. provide for all of the claimed limitations (albeit separate programmed processors) as follows: Chui et al. provide for a computer-readable medium storing a computer program for the wavelet transform of an input image in c. 16, lines 34-64, Fig. 2, blocks 48a – 48c, and Fig. 4, blocks 60 and 65. In a separate computer-readable medium storing a computer program, Chui et al. provide for quantizing the wavelet transformed image in c. 17, lines 14-28, Fig. 4, block 62, and Fig. 2, block 50. In another separate computer-readable medium storing a computer program, Chui et al. provide for entropy coding (e.g. Huffman or arithmetic) in c. 17, lines 51-65 ("programmed") and Fig. 4, block 64 (note that the TMS320C30 is also used in the

wavelet transform, which is recited to include program code in c. 16, lines 51-52, and can also be used with the entropy coder, c. 17, lines 52-54), which is further capable of outputting a compressed image "file" as shown in Fig. 1, blocks 22 and 24, Fig. 2, block 54, and Fig. 4, block 68, and as noted in c. 7, lines 27-32, and in the first five lines of c. 16, where the compressed image is appropriately formatted for disk or archival storage, which is tantamount to a compressed image file.

Thus, Chui et al. provides for all of the limitations except for the minor difference of having more than one computer-readable mediums storing computer programs as opposed to the claimed implied singular computer program. Rich et al. similarly provide for a wavelet transform, quantization, entropy coding, and storage (although not explicitly for a file, but a file is already provided by Chui et al.) in c. 18, lines 12-27, c. 20, lines 6-15, and Fig. 10. Rich et al. provide for performing these acts in "the form of a computer program product on a computer-readable storage medium having computer-readable program code means embodied in the medium" and that any "suitable computer readable medium may be utilized" in c. 4, lines 3-6. It would've been obvious to one having ordinary skill in the art at the time the invention was made to use a computer-readable program code means" in place of the programs of Chui et al. as taught by Rich et al., since this provides for the advantage of portability as well as the advantage of being stored in different forms such as several different devices as noted in c. 4, lines 6-8 of Rich et al.

Response to Amendment

6. The title is now descriptive.

7. Applicant's arguments filed October 3, 2000 have been fully considered but they are not persuasive.

The Applicant argues on pages 3-6 of the amendment, that Calderbank et al. "teaches away from the present invention as recited in claim 16", because they recite disadvantages, with respect to the wavelet coefficients of the integer wavelet transform having the same finite number of bits as the pixels of the image.

The Examiner respectively disagrees. What the Applicant failed to mention with respect to Calderbank et al. is that they also recite that "it is useful for certain implementations" in the last full paragraph on page 35. As with any system, there typically tradeoffs in advantages and disadvantages. Thus, Calderbank et al. do not "teach away". As noted above, the Patent Office is requesting this document from the Applicant. It is further noted that Said et al. provide for the same claimed feature as noted in the rejection above in section II on page 1304 under equation 5, where the same number of bits are used to represent the coefficients as the pixels. Also, this is suggested with any transform, such as that of Chui et al., since the wavelet transform does not alter the number of bits, but rather transforms the image to a more tractable domain for the purpose of image compression.

The Applicant argues on pages 4-5 of the amendment, that "none of the prior art of record teach or suggest the memory containing a computer program as recited in claim 21".

The Examiner respectively disagrees. The Applicant did not cite any specific reference. Furthermore, a digital system, being embodied in a computer readable medium is not the critical aspect of the Applicant's invention, does not provide for unexpected results by doing so (a computer readable medium is expected in compression algorithms), and is also well known. Chui et al. provide for several computer readable mediums instead of one as claimed, so that Chui et al. provides for at least an equivalent system, and is further obvious that they can use a single computer readable medium as such is conventional and well known in the art. In any case, the very well known conventionality of using a computer readable medium for use in image

compression is provided by Rich et al. using a wavelet transform, quantization, entropy coding, and storage in c. 18, lines 12-27, c. 20, lines 6-15, and Fig. 10. Rich et al. provide for performing these acts in "the form of a computer program product on a computer-readable storage medium having computer-readable program code means embodied in the medium" and that any "suitable computer readable medium may be utilized" in c. 4, lines 3-6.

The Applicant is reminded that one cannot show nonobviousness by attacking references individually where the rejections are based on combinations of references. In re Keller, 642 F.2d 413, 208 USPQ 871 (CCPA 1981); In re Merck & Co., Inc., 800 F.2d 1091, 231 USPQ 375 (Fed. Cir. 1986)

Final

8. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Contact Information

9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Timothy M. Johnson whose telephone number is (703) 306-3096.

Any inquiry of a general nature or relating to the status of this application should be directed to the Group receptionist whose telephone numbers are (703) 305-4700 or (703) 305-4750.

The Group Art Unit FAX number is 703-872-9314.

TJ
Timothy M. Johnson
Patent Examiner
Art Unit 2623
July 10, 2001

Timothy M. Johnson
TIMOTHY M. JOHNSON
PATENT EXAMINER